

REMARKS

Claims 1 and 22 are objected to and Claims 1-22 are rejected under 35 USC §102 and under the judicially created doctrine of obviousness-type double patenting. The applicants respectfully traverse these rejections and request reconsideration of the application in view of the above amendments and the following remarks.

Claims 1-4, 19 and 22 have been amended. None of these changes constitute new matter since this clarification of the claims is supported by the original disclosure.

OBJECTIONS

Claims 1 and 22 were objected to for certain informalities. At the examiner's suggestion, Claim 1 has been amended to replace the phrase "of the formula" with the phrase "having a formula". At the examiner's suggestion, Claim 22 has been amended to replace the phrase "is formed into" with the phrase "in the form of". These changes in language have been made to Claims 1 and 22 to clarify the claimed subject matter without intending to narrow the scope of the claims.

REJECTIONS UNDER 25 USC §102

Claims 1-22 are rejected under 35 USC 102(a) as being anticipated by U.S. Patent no. 6,504,053 to Chaturvedi et al. ("Chaturvedi"). Specifically, the Office Action suggests that Chaturvedi discloses a catalyst containing a promoted mixed metal oxide having the empirical formula $A_aM_bN_cX_dZ_eO_f$ wherein A is at least one element selected from the group consisting of Mo and W, M is at least one element selected from the group consisting of V and Ce, N is at least one element selected from the group consisting of Te, Sb and Se, X is at least one element selected from

the group consisting of Nb, Ta, Ti, Al, Zr, Cr, Mn, Fe, Ru, Co, Rh, Ni, Pt, Sb, Bi, B, In, As, Ge, Sn, Li, Na, K, Rb, Cs, Fr, Be, Mg, Ca, Sr, Ba, Ra, Hf, Pb, P, Pm, Eu, Gd, Dy, Ho, Er, Tm, Yb and Lu, and Z is selected from the group consisting of Ni, Pd, Cu, Ag and Au; and wherein $a=1$, $b=0.01$ to 1.0 , $c=0.01$ to 1.0 , $d=0.01$ to 1.0 , $e=0.001$ to 0.1 and f is dependent on the oxidation state of the other elements.

Claim 1 has been amended and now reads in part "a compound having the formula: $Mo_1V_aSb_bNb_cGa_dO_x$ ". Support for this language is found on page 13, line 15, and Claim 3 as originally filed. This change in language has been made to Claim 1 to clarify the claimed subject matter. Claim 19 has been amended to delete compositions which do not contain gallium.

Chaturvedi does not disclose gallium as an element in the empirical formula for the mixed metal oxide catalyst. It is established case law that a reference publication must contain within itself a sufficient description to enable a person having ordinary skill in the art to make the invention without an unreasonable amount of experimentation. Since there is an element in the claimed invention not disclosed in the reference cited by the examiner, there can be no anticipation.

Claims 1-22 are rejected under 35 USC 102(b) as being anticipated by U.S. Patent no. 5,472,925 to Ushikubo et al. ("Ushikubo"). Specifically, the Office Action suggests that Ushikubo discloses a complex oxide catalyst having the empirical formula $Mo_aV_bTe_cX_xO_n$ wherein X is at least one element selected from the group consisting of Nb, Ta, W, Ti, Al, Zr, Cr, Mn, Fe, Ru, Co, Rh, Bi, Pd, Pt, Sn, Bi, B and Ce. Ushikubo also discloses a process for producing a catalyst which comprises adding a compound of at least one element selected from the group consisting of antimony, bismuth, cerium, boron, manganese, chromium, gallium, germanium, yttrium and lead to the complex oxide catalyst.

Ushikubo discloses at col. 5, lines 23-29:

...a catalyst having a certain specific oxide incorporated (sic) to the complex oxide. As such a specific oxide, it is possible to employ an oxide containing at least one member selected from the group consisting of antimony, bismuth, cerium, boron, manganese, chromium, gallium, germanium, yttrium and lead. An antimony oxide is particularly preferred.

Further, at col. 6, lines 26-34:

The gallium oxide may, for example, be Ga_2O or Ga_2O_3 . These oxides may be used alone or in combination as a mixture of a plurality of them, and they may be used in the form of a hydrate. In some cases, a compound containing gallium, such as GaCl_2 or GaCl_3 , may be added to the complex oxide of the formula (1), followed by calcination, and the calcined product can be used as a solid catalyst. In this case, the gallium-containing compound will be converted to gallium oxide by calcination.

It is apparent that the gallium component is discrete and separate from the complex oxide catalyst.

Claim 1 has been amended and now reads in part "[a] mixed metal oxide catalyst composition". Support for this language is found on page 12, lines 23-24, and page 13, line 3. This change in language has been made to Claim 1 to clarify the claimed subject matter without intending to narrow the scope of the claims.

Claim 1 has been amended and now clarifies that the claimed invention is for a catalyst in which gallium is an element in the mixed metal oxide composition unlike Ushikubo where gallium is a component separate from the complex oxide. A reference cited as prior art for anticipation under 35 USC §102(b) must teach each and every element of the claimed invention [Hybritech Inc. v. Monoclonal Antibodies, Inc., 231 USPQ 81, 90 (Fed. Cir. 1986)]. The cited reference must disclose all of the claimed elements arranged as in the claim [Richardson v. Suzuki Co., 9 USPQ 2d 1913, 1092 (Fed. Cir. 1989)]. The law requires identity between the claimed invention and the cited reference which must teach the entirety of the claimed invention [Structural Rubber Products, Co. v. Park Rubber Co., 223 USPQ 1264, 1271 (Fed. Cir. 1984)].

Ushikubo does not meet the requirements for an anticipatory reference since all of the claimed elements are not as arranged in the claimed invention. The claimed invention contains an element not disclosed in Ushikubo: gallium as an element in the mixed metal oxide composition.

Claims 1-22 are rejected under 35 USC 102(e) as being anticipated by U.S. Patent no. 6,620,973 to Karim et al. ("Karim"). Specifically, the Office Action suggests that Karim discloses a catalyst composition having the formula $\text{Mo}_a\text{Pd}_b\text{Bi}_c\text{Fe}_d\text{X}^1_e\text{X}^2_f\text{X}^3_g\text{O}_z$ wherein X^1 is at least one element selected from the group consisting of Co, Ni, V, Pt, Rh or mixtures thereof, X^2 is at least one element selected from the group consisting of Al, Ga, Mn, Nb, Zn, Ag, P, Si, W or mixtures thereof, and X^3 is at least one element selected from the group consisting of K, Mg, Rb, Ca, Sr, Ba, Na, In or mixtures thereof.

The claimed invention is for a catalyst containing antimony. Karim does not disclose a catalyst containing antimony. Antimony is not listed in the components of the disclosed catalyst. The only reference to "antimony" in Karim is at col. 3, line 17:

Preferably, vanadium, bismuth, iron, cobalt, aluminum, gallium, silicon, germanium, **antimony**, phosphorous, niobium, potassium, magnesium palladium, tungsten, manganese are introduced as salts or acids, oxides, hydrate oxides, acetates, chlorides, nitrates, oxalates, or tartrates. (emphasis added)

There is no disclosure of antimony as an element in the catalyst composition. To constitute an anticipatory reference, the prior must contain an enabling disclosure. The disclosure of Karim does not enable a catalyst composition having antimony as an element. Indeed, the disclosure of Karim cited by the examiner (page 5, first paragraph, of the Office Action) does not list antimony in the elements of the catalyst composition. Karim does not meet the requirement of an anticipatory reference for the claimed invention.

OBVIOUSNESS-TYPE DOUBLE PATENTING

Claims 1-22 were rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 1-10 and 13-15 of U.S. Patent no. 6,919,472 (“’472”) and Claims 1-28 of U.S. Patent no. 7,009,075 (“’075”). The Office Action suggests that ‘472 claims a catalyst composition with the only difference from the claimed composition being that antimony is not claimed. The Office Action also suggests that ‘075 claims the same catalyst composition as the claimed invention.

Obviousness-type double patenting is defined as when claims in a patent application are an obvious variation of the invention defined in a claim in a patent (MPEP §804). The analysis employed in an obviousness-type double patenting rejection parallels the guidelines for an analysis of a 35 USC §103 obviousness determination. If claims are unobvious under 35 USC §103, there can be no double patenting.

'472 claims a catalyst composition having the formula of $\text{MoV}_a\text{Nb}_b\text{Ag}_c\text{M}_d\text{O}_x$ wherein M is one or more elements selected from the group consisting of aluminum, copper, lithium, sodium, potassium, rubidium, cesium, gallium, phosphorus, iron, rhenium, cobalt, chromium, manganese, arsenic, indium, thallium, bismuth, germanium, tin, cerium or lanthanum and d is 0 to 0.5. As the examiner notes, antimony is not listed in the elements. In addition, gallium may or may not be present, i.e., d may or may not be 0.

'075 claims a process for producing an unsaturated carboxylic acid for an alkane using a catalyst composition of the formula $\text{MoV}_a\text{Nb}_b\text{Te}_c\text{Sb}_d\text{M}_e\text{O}_x$ wherein Mo is molybdenum, V is vanadium, Nb is niobium, Te is tellurium, Sb is antimony and M is one or more elements selected from the group consisting of silver, silicon, sulfur, zirconium, titanium, aluminum, copper, lithium, sodium, potassium, rubidium, cesium, gallium, phosphorus, iron, rhenium, cobalt, chromium, manganese, arsenic, indium, thallium, bismuth, germanium, tin, cerium and lanthanum; a is 0.05 to 0.99; b is 0.01 to 0.99; c is 0.01 to 0.15; d is 0.01 to 0.2; e is 0 to 0.5; and x is determined by the valence requirements of the other components of the catalyst composition. The examiner argues that the catalyst composition of '075 is the same as the claimed catalyst composition. However, gallium may or may not be present, i.e., e may or may not be 0.

The criteria to establish a *prima facie* case obviousness are stated in MPEP §2142. First, MPEP §2142 requires some suggestion or motivation to modify the reference. Such suggestion or motivation to modify catalyst compositions of '472 by adding antimony and of '075 by requiring the presence of gallium did not exist. MPEP§2142 also requires a reasonable expectation of success. While it may have been obvious-to-try a catalyst composition containing antimony and gallium, obvious-to-try is not equivalent to a reasonable expectation of success. Further, according

to MPEP§2142, the prior art reference must teach or suggest all the claim limitations. Neither '472 nor '075 specifically teach or suggest a catalyst composition containing antimony and gallium. The examiner has not explained how one having ordinary skill in the art would be motivated to modify the claims of '472 and '075 to a catalyst composition containing antimony and gallium beyond a general statement that antimony is a known catalytic material ('472) and that the same catalyst material is inherently suitable for the same process ('075). The applicants will point out that many other elements are known as catalytic material. The examiner's selection of antimony without any showing of a specific suggestion or motivation over any other known catalytic material and the examiner's assumption of the presence of gallium are most definitely a hindsight construction of the claimed invention. The rejections under the judicially created doctrine of obviousness-type double patenting based on '472 and '075 do not meet the criteria for establishing obviousness-type double patenting. Further, the overlapping of claims is not a significant or controlling factor in obviousness-type double patenting. In re Longi et al, 225 USPQ 645 (CAFC 1985).

Even if a prima facie case of obviousness were established by the cited references, the unexpected results of the claimed invention would satisfy the requirements of patentability. The applicants respectfully direct the examiner's attention to pages 19-20, Comparative Example 1, page 21, Examples 1 and 2, and page 29, Table 1. Comparative Example 1 discloses a mixed metal oxide with a nominal composition of $\text{Mo}_1\text{V}_{0.3}\text{Nb}_{0.05}\text{Sb}_{0.15}\text{O}_x$. Example 1 discloses a mixed metal oxide with a nominal composition of $\text{Mo}_1\text{V}_{0.3}\text{Nb}_{0.05}\text{Sb}_{0.15}\text{Ga}_{0.03}\text{O}_x$. 1 g of each catalyst was tested for propane oxidation with a feed having a propane/O₂/N₂/water ratio of 1/1.6/14.4/15 and at the same temperature and pressure and approximately the same residence time (see Table 1, Comparative Example 1 and Example 2). The propane conversion, acrylic acid selectivity, acrylic

acid yield and acrylic acid productivity for the catalyst containing gallium (Example 2) is significantly higher than that for the catalyst not containing gallium (Comparative Example 1). The applicants request that the examiner consider this data which demonstrates the efficacy of the presence of gallium in a mixed metal oxide catalyst as in the claimed invention. Since the claims of '472 and '075 do not require the presence of gallium, the applicants request that the examiner withdraw the obviousness-type double patenting rejections.

Claims 2, 3 and 4 have been amended. Claim 2 has been amended to conform to the formula in Claim 1, as amended, on which Claim 2 depends. Claim 3 has been amended to include bismuth, silver or gold in the formula. Support for this language is found on page 12, line 2; page 13, line 9, and in Claim 1 as originally filed. Claim 4 has been amended to depend on Claim 2 instead of Claim 3. This change in language has been made to Claims 2, 3 and 4 to clarify the claimed subject matter.

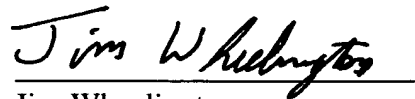
The applicants believe that no extension of term is required. However, this conditional petition is being made to provide for the possibility that the applicants have inadvertently overlooked the need for a petition and fee for extension of time. If an additional extension of time is required, please consider this a petition therefor. The Commissioner is hereby authorized to charge any additional fees due by filing this paper or to credit any overpayment to Account No.502025.

SERIAL NO. 10/806,862
HAZIN, ELLIS

PATENT APPLICATION
STC-01-0006

On the basis of the above amendments and remarks, reconsideration of this application is requested and its allowance requested at the examiner's earliest convenience. No new matter has been added.

Respectfully submitted,

A handwritten signature in cursive script, reading "Jim Wheelington", is written over a horizontal line.

Jim Wheelington
Reg. No. 33,051

SABIC Americas, Inc.
SABIC Technology Center
1600 Industrial Blvd.
Sugar Land, Texas 77478
(281) 207-5719
Customer no. 30691

Listing of Claims in the Application

1(currently amended). A mixed metal oxide catalyst composition for production of an unsaturated carboxylic acid from an alkane comprising a compound ~~of the formula~~ having the formula:



wherein Mo is molybdenum, V is vanadium, Sb is antimony, Nb is niobium, Ga is gallium ~~M is gallium, bismuth, silver or gold~~, a is from 0.01 to 1, b is 0.01 to 1, c is 0.01 to 1, d is 0.01 to 1, and x is determined by the valence requirements of the other elements present.

2(currently amended). The catalyst composition of Claim 1 wherein the formula is:



wherein M' is tantalum, titanium, aluminum, zirconium, chromium, manganese, iron, ruthenium, cobalt, rhodium, nickel, platinum, boron, arsenic, lithium, sodium, potassium, rubidium, calcium, beryllium, magnesium, cerium, strontium, hafnium, phosphorus, europium, gadolinium, dysprosium, holmium, erbium, thulium, terbium, ytterbium, lutetium, lanthanum, scandium, palladium, praseodymium, neodymium, yttrium, thorium, tungsten, cesium, zinc, tin, germanium, silicon, lead, barium and thallium and e is 0.0 to 1.

3(currently amended). ~~The catalyst composition of Claim 2 wherein M is gallium.~~ The catalyst composition of Claim 2 wherein the formula is:



wherein M is bismuth, silver or gold and d' is 0.01 to 1.

4(currently amended). The catalyst composition of Claim 3 2 wherein M' is tungsten.

5(original). The catalyst composition of Claim 1 wherein a is 0.01 to 0.75.

6(original). The catalyst composition of Claim 5 wherein a is 0.1 to 0.5.

7(original). The catalyst composition of Claim 6 wherein a is 0.3.

8(original). The catalyst composition of Claim 1 wherein b is 0.01 to 0.5.

9(original). The catalyst composition of Claim 8 wherein b is 0.1 to 0.5.

10(original). The catalyst composition of Claim 9 wherein b is 0.15.

11(original). The catalyst composition of Claim 1 wherein c is 0.01 to 0.5.

12(original). The catalyst composition of Claim 11 wherein c is 0.1 to 0.5.

13(original). The catalyst composition of Claim 12 wherein c is 0.05.

14(original). The catalyst composition of Claim 1 wherein d is 0.01 to 0.5.

15(original). The catalyst composition of Claim 14 wherein d is 0.1 to 0.1.

16(original). The catalyst composition of Claim 15 wherein d is 0.03 to 0.06.

17(original). The catalyst composition of Claim 2 wherein e is 0.0 to 0.5.

18(original). The catalyst composition of Claim 17 wherein e is 0.0 to 0.01.

19(currently amended). The catalyst composition of Claim 1 selected from the group consisting of $\text{Mo}_1\text{V}_{0.3}\text{Sb}_{0.15}\text{Nb}_{0.05}\text{Ga}_{0.03}\text{O}_x$, $\text{Mo}_1\text{V}_{0.3}\text{Sb}_{0.08}\text{Nb}_{0.05}\text{Ga}_{0.03}\text{O}_x$, ~~$\text{Mo}_1\text{V}_{0.3}\text{Nb}_{0.05}\text{Sb}_{0.15}\text{Bi}_{0.03}\text{O}_x$~~ , ~~$\text{Mo}_1\text{V}_{0.3}\text{Sb}_{0.15}\text{Nb}_{0.05}\text{Ag}_{0.06}\text{O}_x$~~ , ~~$\text{Mo}_1\text{V}_{0.3}\text{Sb}_{0.15}\text{Nb}_{0.05}\text{Au}_{0.015}\text{O}_x$~~ and $\text{Mo}_1\text{V}_{0.3}\text{Nb}_{0.05}\text{Sb}_{0.15}\text{Ga}_{0.03}\text{W}_{0.012}\text{O}_x$.

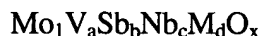
20(original). The catalyst composition of Claim 1 wherein the catalyst composition is supported on an inert support.

21(original). The catalyst composition of Claim 20 wherein the inert support is silica, alumina, niobia, titania, zirconia and mixtures thereof.

22(currently amended). The catalyst composition of Claim 1 wherein the catalyst composition is ~~formed into~~ in the form of powder, granules, spheres, cylinders or saddles.

23(withdrawn). A process of making a catalyst composition for production of an unsaturated carboxylic acid from an alkane comprising:

- a) forming a solution of a molybdenum compound, a vanadium compound, an antimony compound, a niobium compound and a compound of gallium, silver or gold;
- b) mixing the solution to form a uniform solution;
- c) removing liquid from the uniform solution to form a solid;
- d) drying the solid;
- e) calcining the solid to form a catalyst of the formula:



wherein Mo is molybdenum, V is vanadium, Sb is antimony, Nb is niobium, M is gallium, silver or gold, O is oxygen, a is from 0.01 to 1, b is 0.01 to 1, c is 0.01 to 1, d is 0.01 to 1 and x is determined by the valence requirements of the other elements present.

24(withdrawn). The process of Claim 23 wherein the solution additionally comprises one of more compounds of M' wherein M' is one or more elements selected from the group consisting of tantalum, titanium, aluminum, zirconium, chromium, manganese, iron, ruthenium, cobalt, rhodium, nickel, platinum, boron, arsenic, lithium, sodium, potassium, rubidium, calcium, beryllium, magnesium, cerium, strontium, hafnium, phosphorus, europium, gadolinium, dysprosium, holmium, erbium, thulium, terbium, ytterbium, lutetium, lanthanum, scandium, palladium, praseodymium, neodymium, yttrium, thorium, tungsten, cesium, zinc, tin, germanium, silicon, lead, barium and thallium to form a catalyst of the formula:



wherein e is 0 to 1.0.

25(withdrawn). The process of Claim 24 wherein M is gallium.

26(withdrawn). The process of Claim 25 wherein M' is tungsten.

27(withdrawn). The process of Claim 23 wherein a is 0.01 to 0.75.

28(withdrawn). The process of Claim 27 wherein a is 0.1 to 0.5.

29(withdrawn). The process of Claim 28 wherein a is 0.3.

30(withdrawn). The process of Claim 23 wherein b is 0.01 to 0.5.

31(withdrawn). The process of Claim 30 wherein b is 0.1 to 0.5.

32(withdrawn). The process of Claim 31 wherein b is 0.15.

33(withdrawn). The process of Claim 23 wherein c is 0.01 to 0.5.

34(withdrawn). The process of Claim 33 wherein c is 0.1 to 0.5.

35(withdrawn). The process of Claim 34 wherein c is 0.05.

36(withdrawn). The process of Claim 23 wherein d is 0.01 to 0.5.

37(withdrawn). The process of Claim 36 wherein d is 0.1 to 0.1.

38(withdrawn). The process of Claim 37 wherein d is 0.03 to 0.06.

39(withdrawn). The process of Claim 23 wherein e is 0.0 to 0.5.

40(withdrawn). The process of Claim 39 wherein e is 0.0 to 0.1.

41(withdrawn). The process of Claim 23 wherein the molybdenum compound is ammonium paramolybdate, molybdenum oxide, molybdic acid or molybdenum chloride.

42(withdrawn). The process of Claim 23 wherein the vanadium compound is ammonium metavanadate, vanadium oxide, vanadium oxalate or vanadium sulfate.

43(withdrawn). The process of Claim 23 wherein the niobium compound is niobium oxalate, ammonium niobium oxalate, niobic acid, hydrous niobium oxide or niobium oxide.

44(withdrawn). The process of Claim 23 wherein the niobium compound is formed from a solution of a dicarboxylic acid or a tricarboxylic acid and niobic acid dissolved in water.

45(withdrawn). The process of Claim 44 wherein the dicarboxylic acid is oxalic acid.

46(withdrawn). The process of Claim 44 wherein the dicarboxylic acid is malonic acid, succinic acid, glutaric acid or adipic acid.

47(withdrawn). The process of Claim 44 wherein the tricarboxylic acid is citric acid.

48(withdrawn). The process of Claim 23 wherein the antimony compound is antimony oxides, antimony chlorides, antimony sulfate, antimony tartrate or antimony acetate.

49(withdrawn). The process of Claim 23 wherein the silver compound is silver oxide, silver acetate, silver carbonate, silver nitrate or silver chloride.

50(withdrawn). The process of Claim 23 wherein the gallium compound is gallium oxide, gallium nitrate, gallium chloride, gallium acetylacetonate or gallium sulfate.

51(withdrawn). The process of Claim 23 wherein the bismuth compound is bismuth acetate, bismuth hydroxide, bismuth nitrate, bismuth nitrate hydrates, bismuth(III) nitrate oxide, bismuth(III) oxide, bismuth citrate, bismuth fluoride, bismuth chloride, bismuth bromide, bismuth iodide, bismuth(III) oxychloride, bismuth(III) oxynitrate, bismuth(III) phosphate, bismuth subcarbonate, bismuth subnitrate, bismuth subnitrate monohydrate, bismuth subsalicylate or bismuth(III) sulfide.

52(withdrawn). The process of Claim 23 wherein the gold compound is gold bromide, gold chloride, gold hydroxide, gold iodide or hydrogen tetrachloroaurate.

53(withdrawn). The process of Claim 24 wherein the compound of M' is an oxalate, a tartrate, a citrate, a nitrate, a halide, a carbonate, a bicarbonate, a hydroxide or an oxide.

54(withdrawn). The process of Claim 23 additionally comprising supporting the catalyst on an inert support.

55(withdrawn). The process of Claim 54 wherein the inert support is silica, alumina, niobia, titania, zirconia and mixtures thereof.

56(withdrawn). The process of Claim 23 wherein the liquid solvent is removed by filtration, evaporation or centrifuge.

57(withdrawn). The process of Claim 56 wherein the liquid solvent is removed by evaporation.

58(withdrawn). The process of Claim 23 wherein the liquid is removed and the solid is dried by spray drying.

59(withdrawn). The process of Claim 58 wherein the spray drying outlet temperature is in the range from 90°C to 105°C.

60(withdrawn). The process of Claim 23 wherein calcining occurs in an inert gas.

61(withdrawn). The process of Claim 60 wherein the inert gas is argon or nitrogen.

62(withdrawn). The process of Claim 23 wherein calcining is at a temperature in the range of 550-650°C for 1 to 10 hours.

63(withdrawn). The process of Claim 23 additionally comprising ballmilling, grinding or crushing the catalyst after calcining.

64(withdrawn). The process of Claim 23 wherein the catalyst is selected from the group consisting of $\text{Mo}_1\text{V}_{0.3}\text{Sb}_{0.15}\text{Nb}_{0.05}\text{Ga}_{0.03}\text{O}_x$, $\text{Mo}_1\text{V}_{0.3}\text{Sb}_{0.08}\text{Nb}_{0.05}\text{Ga}_{0.03}\text{O}_x$, $\text{Mo}_1\text{V}_{0.3}\text{Nb}_{0.05}\text{Sb}_{0.15}\text{Bi}_{0.03}\text{O}_x$, $\text{Mo}_1\text{V}_{0.3}\text{Sb}_{0.15}\text{Nb}_{0.05}\text{Ag}_{0.06}\text{O}_x$, $\text{Mo}_1\text{V}_{0.3}\text{Sb}_{0.15}\text{Nb}_{0.05}\text{Au}_{0.015}\text{O}_x$ and $\text{Mo}_1\text{V}_{0.3}\text{Nb}_{0.05}\text{Sb}_{0.15}\text{Ga}_{0.03}\text{W}_{0.012}\text{O}_x$.

65(withdrawn). A process for producing an unsaturated carboxylic acid from an alkane comprising:

contacting an alkane and molecular oxygen with a catalyst composition of the formula:



wherein Mo is molybdenum, V is vanadium, Sb is antimony, Nb is niobium, M is gallium, silver or gold, a is from 0.01 to 1, b is 0.01 to 1, c is 0.01 to 1, d is 0.01 to 1, and x is determined by the valence requirements of the other elements present.

66(withdrawn). The process of Claim 65 wherein the catalyst composition is of the formula:



wherein M' is tantalum, titanium, aluminum, zirconium, chromium, manganese, iron, ruthenium, cobalt, rhodium, nickel, platinum, boron, arsenic, lithium, sodium, potassium, rubidium, calcium, beryllium, magnesium, cerium, strontium, hafnium, phosphorus, europium, gadolinium, dysprosium, holmium, erbium, thulium, terbium, ytterbium, lutetium, lanthanum, scandium, palladium, praseodymium, neodymium, yttrium, thorium, tungsten, cesium, zinc, tin, germanium, silicon, lead, barium and thallium and e is 0.0 to 1.

67(withdrawn). The process of Claim 65 wherein M is gallium.

68(withdrawn). The process of Claim 67 wherein M' is tungsten.

69(withdrawn). The process of Claim 65 wherein a is 0.01 to 0.75.

70(withdrawn). The process of Claim 69 wherein a is 0.1 to 0.5.

71(withdrawn). The process of Claim 70 wherein a is 0.3.

72(withdrawn). The process of Claim 65 wherein b is 0.01 to 0.5.

73(withdrawn). The process of Claim 72 wherein b is 0.1 to 0.5.

74(withdrawn). The process of Claim 73 wherein b is 0.15.

75(withdrawn). The process of Claim 65 wherein c is 0.01 to 0.5.

76(withdrawn). The process of Claim 75 wherein c is 0.1 to 0.5.

77(withdrawn). The process of Claim 76 wherein c is 0.05.

78(withdrawn). The process of Claim 65 wherein d is 0.01 to 0.5.

79(withdrawn). The process of Claim 78 wherein d is 0.1 to 0.1.

80(withdrawn). The process of Claim 79 wherein d is 0.03 to 0.06.

81(withdrawn). The process of Claim 65 wherein e is 0.0 to 0.5.

82(withdrawn). The process of Claim 81 wherein e is 0.0 to 0.1.

83(withdrawn). The process of Claim 65 selected from the group consisting of $\text{Mo}_1\text{V}_{0.3}\text{Sb}_{0.15}\text{Nb}_{0.05}\text{Ga}_{0.03}\text{O}_x$, $\text{Mo}_1\text{V}_{0.3}\text{Sb}_{0.08}\text{Nb}_{0.05}\text{Ga}_{0.03}\text{O}_x$, $\text{Mo}_1\text{V}_{0.3}\text{Nb}_{0.05}\text{Sb}_{0.15}\text{Bi}_{0.03}\text{O}_x$, $\text{Mo}_1\text{V}_{0.3}\text{Sb}_{0.15}\text{Nb}_{0.05}\text{Ag}_{0.06}\text{O}_x$, $\text{Mo}_1\text{V}_{0.3}\text{Sb}_{0.15}\text{Nb}_{0.05}\text{Au}_{0.015}\text{O}_x$ and $\text{Mo}_1\text{V}_{0.3}\text{Nb}_{0.05}\text{Sb}_{0.15}\text{Ga}_{0.03}\text{W}_{0.012}\text{O}_x$.

84(withdrawn). The process of Claim 65 wherein the catalyst composition is supported on an inert support.

85(withdrawn). The process of Claim 84 wherein the inert support is silica, alumina, niobia, titania, zirconia and mixtures thereof.

86(withdrawn). The process of Claim 65 wherein the catalyst composition is formed into powder, granules, spheres, cylinders or saddles.

87(withdrawn). A process of ammoxidation of alkanes and olefins comprising:
contacting an alkane or olefin with molecular oxygen and ammonia in the presence of a catalyst
composition of the formula:



wherein Mo is molybdenum, V is vanadium, Sb is antimony, Nb is niobium, M is bismuth, silver or gold, a is from 0.01 to 1, b is 0.01 to 1, c is 0.01 to 1, d is 0.01 to 1, and x is determined by the valence requirements of the other elements present.

88(withdrawn). The process of Claim 87 wherein the alkane is propane to produce acrylonitrile.

89(withdrawn). The process of Claim 87 wherein the alkane is isobutane to produce methacrylonitrile.